

Vanclay, J.K., 1993. Synthesis: steps towards sustainability. In: P.J. Wood, J.K. Vanclay and Wan Razali Wan Mohd (eds) *The Quest for Sustainability: 100 years of silviculture and management in the tropics*. Proceedings of Tropical Silviculture Workshop, IUFRO Centennial conference, Berlin, 1-3 September, 1992. FRIM, Kuala Lumpur, p. 145-146.

Synthesis: Steps towards Sustainability

J.K Vanclay

Royal Veterinary and Agricultural University, Denmark

Summary

The maturity of tropical silviculture is reflected in this volume. Papers address not only the technical aspects of tree culture, but also stress the ecological, social and economic issues which may be the critical success factors in many forestry projects. Papers reveal many useful guidelines, but care is required in generalizing these to other situations, as silviculture and technology suited to one area may not be suited elsewhere.

The Nature of the Tropical Forest

Despite vast extent and lush green appearance of some tropical forests, we cannot assume that the forest is self-perpetuating and that the resource is infinite. The first step towards sustainable management is to recognise that the resource is finite and that exploitation for timber and other products must be in harmony with natural processes (Vanclay 1993). It is also important to realize that these forests may not be "pristine primeval forests", and that the present structure and composition of the forest may be anthropogenic (Graaf and Hendrison 1993). Nor should we become preoccupied with the tropical moist forest, as the dry tropics are also important (Maydell 1993). Plantations provide an alternative to natural forest management, and plantations in the tropics may soon contribute 15% of the world's wood supply (Evans *et al.* 1993).

Management of People and Forests

Success in any enterprise depends upon the people involved and affected by it, and forestry is no exception. Successful forestry requires the involvement and cooperation of many people in its planning and conduct (Bertault *et al.* 1993). The long term nature of forestry poses an added complexity, and continuity in policy, research and assistance is essential if tropical forestry is to make headway (Salazar 1993).

Successful tropical forest management requires efficient documentation and extension. It requires simple, practical prescriptions based on an understanding of silvics (Palmer and Dawkins 1993). Effective supervision of all operations is essential. Effective control of harvesting operations is critical, as logging damage may determine the success or failure of any silvicultural system (Bertault *et al.* 1993). It requires cooperation between research, policy and management institutions (Kio *et al.* 1993).

Sustainability is as much about economics as about ecology. The important question is if sustainable forestry is a safe investment for money, labour and other resources (Graaf and Hendrison 1993). Where mining prevails and determines the price of materials, labour and energy, sustainable land husbandry may not be able to compete. Salazar (1993) observes that the private sector (both industry and individuals) may be efficient in managing forest resources, but may require incentives and other forms of support, especially to become established.

Sustainability

Sustainability necessarily involves change and adaptability and cannot be achieved without trade-offs and compromises (Maydell 1993). It is about people as well as about forests. Sustainable forest management requires training, supervision and incentives for these directly involved, as well as information for and participation by the local community (Vanclay 1993). It requires management for many products and services, and the non-timber aspects may be the most important (Singh 1993).

State forests are often assumed to confer the best prognosis for sustainable forest management, but community stewardship offers a viable alternative and there is scope for both options to exist in harmony (Kartasubrata and Wiersum 1993). And different stewardship systems may challenge management objectives: Should managers attempt to maximize yields or minimize risks?

Evans *et al.* (1993) conclude that sustained production from plantations appears possible, but that careful harvesting and good management is necessary, especially on fragile or infertile sites. This observation also applies to natural forest management.

REFERENCES

- Bertault, J.G., B. Dupuy & H.F. Maitre, 1993. Silvicultural research for sustainable management of rain forest. *In*: P.J. Wood, J.K. Vanclay and Wan Razali Wan Mohd (eds) *The Quest for Sustainability: 100 years of silviculture and management in the tropics*. Proceedings of Tropical Silviculture Workshop, IUFRO Centennial conference, Berlin, 1-3 September, 1992. FRIM, Kuala Lumpur, p. 1-14.
- Evans, J., P.J. Wood & A. Moutanda, 1993. The use of tropical plantations in sustainable forest management. *In*: P.J. Wood, J.K. Vanclay and Wan Razali Wan Mohd (eds) *The Quest for Sustainability: 100 years of silviculture and management in the tropics*. Proceedings of Tropical Silviculture Workshop, IUFRO Centennial conference, Berlin, 1-3 September, 1992. FRIM, Kuala Lumpur, p. 32-48.
- Graaf, N.R. de & J. Hendrison, 1993. Tropical silviculture research in Surinam. *In*: P.J. Wood, J.K. Vanclay and Wan Razali Wan Mohd (eds) *The Quest for Sustainability: 100 years of silviculture and management in the tropics*. Proceedings of Tropical Silviculture Workshop, IUFRO Centennial conference, Berlin, 1-3 September, 1992. FRIM, Kuala Lumpur, p. 101-111.
- Kartasubrata, J. & K.F. Wiersum, 1993. Traditions and recent advances in tropical silviculture research in Indonesia. *In*: P.J. Wood, J.K. Vanclay and Wan Razali Wan Mohd (eds) *The Quest for Sustainability: 100 years of silviculture and management in the tropics*. Proceedings of Tropical Silviculture Workshop, IUFRO Centennial conference, Berlin, 1-3 September, 1992. FRIM, Kuala Lumpur, p. 57-68.

- Kio, P.R.O., J.E. Abu & R.G. Lowe High forest management in Nigeria. *In*: P.J. Wood, J.K. Vanclay and Wan Razali Wan Mohd (eds) *The Quest for Sustainability: 100 years of silviculture and management in the tropics*. Proceedings of Tropical Silviculture Workshop, IUFRO Centennial conference, Berlin, 1-3 September, 1992. FRIM, Kuala Lumpur, p. 112-144.
- Maydell, H.-J. von 1993. Research on sustainable dry land management. *In*: P.J. Wood, J.K. Vanclay and Wan Razali Wan Mohd (eds) *The Quest for Sustainability: 100 years of silviculture and management in the tropics*. Proceedings of Tropical Silviculture Workshop, IUFRO Centennial conference, Berlin, 1-3 September, 1992. FRIM, Kuala Lumpur, p. 25-31.
- Palmer, J.R. & H.C. Dawkins, 1993. Development and application of forest management in teak-bearing tropical moist forest in India and Burma in the 19th century. *In*: P.J. Wood, J.K. Vanclay and Wan Razali Wan Mohd (eds) *The Quest for Sustainability: 100 years of silviculture and management in the tropics*. Proceedings of Tropical Silviculture Workshop, IUFRO Centennial conference, Berlin, 1-3 September, 1992. FRIM, Kuala Lumpur, p. 49-56.
- Salazar, R., 1993. The state of silviculture in Latin America and the role of research in future development. *In*: P.J. Wood, J.K. Vanclay and Wan Razali Wan Mohd (eds) *The Quest for Sustainability: 100 years of silviculture and management in the tropics*. Proceedings of Tropical Silviculture Workshop, IUFRO Centennial conference, Berlin, 1-3 September, 1992. FRIM, Kuala Lumpur, p. 95-100.
- Singh, R.V., 1993. Silvicultural research to achieve sustainability in forest management in India. *In*: P.J. Wood, J.K. Vanclay and Wan Razali Wan Mohd (eds) *The Quest for Sustainability: 100 years of silviculture and management in the tropics*. Proceedings of Tropical Silviculture Workshop, IUFRO Centennial conference, Berlin, 1-3 September, 1992. FRIM, Kuala Lumpur, p. 90-94.
- Vanclay, J.K., 1993. Lessons from the Queensland rainforest: a century striving for sustainability. *In*: P.J. Wood, J.K. Vanclay and Wan Razali Wan Mohd (eds) *The Quest for Sustainability: 100 years of silviculture and management in the tropics*. Proceedings of Tropical Silviculture Workshop, IUFRO Centennial conference, Berlin, 1-3 September, 1992. FRIM, Kuala Lumpur, p. 69-89.

Vanclay, J.K., 1993. Synthesis: steps towards sustainability. In: P.J. Wood, J.K. Vanclay and Wan Razali Wan Mohd (eds) *The Quest for Sustainability: 100 years of silviculture and management in the tropics*. Proceedings of Tropical Silviculture Workshop, IUFRO Centennial conference, Berlin, 1-3 September, 1992. FRIM, Kuala Lumpur, p. 145-146.

Synthesis: Steps towards Sustainability

J.K Vanclay

Royal Veterinary and Agricultural University, Denmark

Summary

The maturity of tropical silviculture is reflected in this volume. Papers address not only the technical aspects of tree culture, but also stress the ecological, social and economic issues which may be the critical success factors in many forestry projects. Papers reveal many useful guidelines, but care is required in generalizing these to other situations, as silviculture and technology suited to one area may not be suited elsewhere.

The Nature of the Tropical Forest

Despite vast extent and lush green appearance of some tropical forests, we cannot assume that the forest is self-perpetuating and that the resource is infinite. The first step towards sustainable management is to recognise that the resource is finite and that exploitation for timber and other products must be in harmony with natural processes (Vanclay 1993). It is also important to realize that these forests may not be "pristine primeval forests", and that the present structure and composition of the forest may be anthropogenic (Graaf and Hendrison 1993). Nor should we become preoccupied with the tropical moist forest, as the dry tropics are also important (Maydell 1993). Plantations provide an alternative to natural forest management, and plantations in the tropics may soon contribute 15% of the world's wood supply (Evans *et al.* 1993).

Management of People and Forests

Success in any enterprise depends upon the people involved and affected by it, and forestry is no exception. Successful forestry requires the involvement and cooperation of many people in its planning and conduct (Bertault *et al.* 1993). The long term nature of forestry poses an added complexity, and continuity in policy, research and assistance is essential if tropical forestry is to make headway (Salazar 1993).

Successful tropical forest management requires efficient documentation and extension. It requires simple, practical prescriptions based on an understanding of silvics (Palmer and Dawkins 1993). Effective supervision of all operations is essential. Effective control of harvesting operations is critical, as logging damage may determine the success or failure of any silvicultural system (Bertault *et al.* 1993). It requires cooperation between research, policy and management institutions (Kio *et al.* 1993).

Sustainability is as much about economics as about ecology. The important question is if sustainable forestry is a safe investment for money, labour and other resources (Graaf and Hendrison 1993). Where mining prevails and determines the price of materials, labour and energy, sustainable land husbandry may not be able to compete. Salazar (1993) observes that the private sector (both industry and individuals) may be efficient in managing forest resources, but may require incentives and other forms of support, especially to become established.

Sustainability

Sustainability necessarily involves change and adaptability and cannot be achieved without trade-offs and compromises (Maydell 1993). It is about people as well as about forests. Sustainable forest management requires training, supervision and incentives for these directly involved, as well as information for and participation by the local community (Vanclay 1993). It requires management for many products and services, and the non-timber aspects may be the most important (Singh 1993).

State Forests are often assumed to confer the best prognosis for sustainable forest management, but community stewardship offers a viable alternative and there is scope for both options to exist in harmony (Kartasubrata and Wiersum 1993). And different stewardship systems may challenge management objectives: Should managers attempt to maximize yields or minimize risks?

Evans *et al.* (1993) conclude that sustained production from plantations appears possible, but that careful harvesting and good management is necessary, especially on fragile or infertile sites. This observation also applies to natural forest management.

REFERENCES

- Bertault, J.G., B. Dupuy & H.F. Maitre, 1993. Silvicultural research for sustainable management of rain forest. *In*: P.J. Wood, J.K. Vanclay and Wan Razali Wan Mohd (eds) *The Quest for Sustainability: 100 years of silviculture and management in the tropics*. Proceedings of Tropical Silviculture Workshop, IUFRO Centennial conference, Berlin, 1-3 September, 1992. FRIM, Kuala Lumpur, p. 1-14.
- Evans, J., P.J. Wood & A. Moutanda, 1993. The use of tropical plantations in sustainable forest management. *In*: P.J. Wood, J.K. Vanclay and Wan Razali Wan Mohd (eds) *The Quest for Sustainability: 100 years of silviculture and management in the tropics*. Proceedings of Tropical Silviculture Workshop, IUFRO Centennial conference, Berlin, 1-3 September, 1992. FRIM, Kuala Lumpur, p. 32-48.
- Graaf, N.R. de & J. Hendrison, 1993. Tropical silviculture research in Surinam. *In*: P.J. Wood, J.K. Vanclay and Wan Razali Wan Mohd (eds) *The Quest for Sustainability: 100 years of silviculture and management in the tropics*. Proceedings of Tropical Silviculture Workshop, IUFRO Centennial conference, Berlin, 1-3 September, 1992. FRIM, Kuala Lumpur, p. 101-111.
- Kartasubrata, J. & K.F. Wiersum, 1993. Traditions and recent advances in tropical silviculture research in Indonesia. *In*: P.J. Wood, J.K. Vanclay and Wan Razali Wan Mohd (eds) *The Quest for Sustainability: 100 years of silviculture and management in the tropics*. Proceedings of Tropical Silviculture Workshop, IUFRO Centennial conference, Berlin, 1-3 September, 1992. FRIM, Kuala Lumpur, p. 57-68.

- Kio, P.R.O., J.E. Abu & R.G. Lowe, 1993. High forest management in Nigeria. *In*: P.J. Wood, J.K. Vanclay and Wan Razali Wan Mohd (eds) The Quest for Sustainability: 100 years of silviculture and management in the tropics. Proceedings of Tropical Silviculture Workshop, IUFRO Centennial conference, Berlin, 1-3 September, 1992. FRIM, Kuala Lumpur, p. 112-144.
- Maydell, H.-J. von 1993. Research on sustainable dry land management. *In*: P.J. Wood, J.K. Vanclay and Wan Razali Wan Mohd (eds) The Quest for Sustainability: 100 years of silviculture and management in the tropics. Proceedings of Tropical Silviculture Workshop, IUFRO Centennial conference, Berlin, 1-3 September, 1992. FRIM, Kuala Lumpur, p. 25-31.
- Palmer, J.R. & H.C. Dawkins, 1993. Development and application of forest management in teak-bearing tropical moist forest in India and Burma in the 19th century. *In*: P.J. Wood, J.K. Vanclay and Wan Razali Wan Mohd (eds) The Quest for Sustainability: 100 years of silviculture and management in the tropics. Proceedings of Tropical Silviculture Workshop, IUFRO Centennial conference, Berlin, 1-3 September, 1992. FRIM, Kuala Lumpur, p. 49-56.
- Salazar, R., 1993. The state of silviculture in Latin America and the role of research in future development. *In*: P.J. Wood, J.K. Vanclay and Wan Razali Wan Mohd (eds) The Quest for Sustainability: 100 years of silviculture and management in the tropics. Proceedings of Tropical Silviculture Workshop, IUFRO Centennial conference, Berlin, 1-3 September, 1992. FRIM, Kuala Lumpur, p. 95-100.
- Singh, R.V., 1993. Silvicultural research to achieve sustainability in forest management in India. *In*: P.J. Wood, J.K. Vanclay and Wan Razali Wan Mohd (eds) The Quest for Sustainability: 100 years of silviculture and management in the tropics. Proceedings of Tropical Silviculture Workshop, IUFRO Centennial conference, Berlin, 1-3 September, 1992. FRIM, Kuala Lumpur, p. 90-94.
- Vanclay, J.K., 1993. Lessons from the Queensland rainforest: a century striving for sustainability. *In*: P.J. Wood, J.K. Vanclay and Wan Razali Wan Mohd (eds) The Quest for Sustainability: 100 years of silviculture and management in the tropics. Proceedings of Tropical Silviculture Workshop, IUFRO Centennial conference, Berlin, 1-3 September, 1992. FRIM, Kuala Lumpur, p. 69-89.